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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent Application Of: Gan et al.

For: Discharge Methodologies For Lithium/Silver Vanadium  
Oxide Cells To Manage Voltage Delay And Permanent RDC  
Growth Region

the specification of which is being transmitted herewith

Assistant Commissioner of Patents  
Alexandria, VA 22313-1450

**INFORMATION DISCLOSURE STATEMENT  
Pursuant to 37 CFR 1.56**

1. Applicants submit herewith patents, publications or other information of which they are aware, which they believe may be material to the examination of this application and in respect of which there may be a duty to disclose in accordance with 37 CFR 1.56.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 CFR 1.56(g)), an admission that the information cited is, or is considered to be material to patentability or that no other material information exists.

The filing of this IDS shall not be construed as an admission against interest in any manner (Notice of Jan. 9, 1992, 1135 O.G. 13-25, at 25).

IDS For: Discharge Methodologies For Lithium/Silver Vanadium  
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Inventor: Gan et al.

2. Attached is Form PTO-1449. Legible copies of all items listed accompany this IDS.

3. A concise explanation of the possible relevance of the listed information items is as follows:

U.S. Patent No. 6,023,151 to Hudson et al. shows a method and device for improving the accuracy of battery/capacity, remaining capacity, and remaining run-time determinations. A specific embodiment of the subject invention relates to implementing a dynamic End of Discharge Voltage (EODV) for rechargeable batteries and battery packs. The EODV can be adjusted based on environment, operating conditions, temperature, residual capacity, cell chemistry, cell size, form factor, discharge rate and/or the number of charge/discharge cycles the battery has undergone.

U.S. Patent No. 6,307,358 to Conrad teaches a method of controlling the electrical power applied to a load comprising the steps of producing a pulse train comprising a series of pulses, defining a cycle in which a portion of the pulse train having a duration of 10% of the cycle delivers more than 20% of the total power to the load which the load receives each cycle, and supplying the pulse train to the load to supply power to the load.

U.S. Patent No. 5,739,672 to Lane shows a method for charging batteries at rates of at least five, or even ten times, normal battery capacity. By employing a pulsed charger in which various charging parameters are modified as a function of a

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Oxide Cells To Manage Voltage Delay And Permanent  
RDC Growth Region  
Inventor: Gan et al.

combination of at least two 1<sup>st</sup> order sense parameters and at least one 2<sup>nd</sup> order sense parameters.

U.S. Patent No. 4,740,739 to Quammen et al. discloses a method for charging batteries where brief pulses of discharging current are superimposed upon the charging current waveform. A discharge current controller is provided in parallel with the battery having a resistor in series with an electrical switching means. The resistor dissipates the battery discharge energy as heat when the electrical switching means allows discharge current to flow. The discharge current is allowed to flow for a pulse duration selected between 50 and 100 microseconds. This brief discharge pulse is repeated at a time period on the order of 20 times the pulse duration.

U.S. Patent No. 5,367,244 to Rose et al. relates to a battery charging method comprising the steps of applying a charging current to the battery from a charge current supply, sensing the battery voltage, reducing the charging current when the battery voltage equals a target voltage and maintaining the battery voltage not greater than the target voltage during the preceding applying and reducing steps. The steps are repeated to provide a stepped current profile until the charging current is reduced to a minimum value. A similar method is described in U.S. Patent No. 5,633,576, also to Rose et al.

IDS For: Discharge Methodologies For Lithium/Silver Vanadium  
Oxide Cells To Manage Voltage Delay And Permanent  
RDC Growth Region  
Inventor: Gan et al.

U.S. Patent No. 5,801,515 to Chen et al. shows a method for ultrarapidly charging a battery wherein the charging current flowing into the battery is a group of pulses of multiple frequencies and multiple waveforms.

U.S. Patent No. 5,598,085 to Hassler discloses a circuit arrangement for charging rechargeable batteries that provides a continuously variable supply of electric energy to a battery to be charged.

U.S. Patent No. 6,153,949 to Soderhall discloses an electric power management system that can provide momentarily high power.

U.S. Patent No. 5,959,371 to Dooley et al. relates to a power management system for an implantable device (an implantable cardioverter/defibrillator) using a comparator to signal when the supply voltage drops below a predetermined threshold. The control electronics pause charging until the power supply voltage exceeds a predetermined threshold. In one embodiment, the amount of pause time per each charge cycle is accumulated; in another embodiment, total charge time for each charge cycle is accumulated. Another charging system for an ICD is shown in U.S. Patent No. 5,904,705 to Kroll et al.

IDS For: Discharge Methodologies For Lithium/Silver Vanadium  
Oxide Cells To Manage Voltage Delay And Permanent  
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4. The person making this statement is the agent who signs  
below, who makes this statement on the information supplied by  
the inventors and the information in the agent's file.

Respectfully submitted,

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# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT**

(Use as many sheets as necessary)

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> (Use as many sheets as necessary)		Application Number			
		Filing Date		August 22, 2003	
		First Named Inventor		Gan et al.	
		Group Art Unit			
		Examiner Name			
Sheet	6	of	6	Attorney Docket Number	37505.0069

## **U.S. PATENT DOCUMENTS**

Examiner Initials*	Cite No. 1	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code 2 (if known)			
	1	4,740,739		Quammen et al.	04-26-1988	
	2	5,367,244		Rose et al.	11-22-1994	
	3	5,633,576		Rose et al.	05-27-1997	
	4	5,739,672		Lane	04-14-1998	
	5	5,801,515		Chen et al.	09-01-1998	
	6	5,904,705		Kroll et al.	05-18-1999	
	7	5,598,085		Hasler	01-28-1997	
	8	5,959,371		Dooley et al.	09-28-1999	
	9	6,023,151		Hudson et al.	02-08-2000	
	10	6,153,949		Soderhall	11-28-2000	
	11	6,307,358 B1		Conrad	10-23-2001	

## **FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Cite No. 1	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines Where Relevant Passages or Relevant Figures Appear	T6
		Office3	Number4	Kind Code5 (if known)				

Examiner Signature		Date Considered	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Unique citation designation number. 2 See attached Kinds of U.S. Patent Documents. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.